

Supplementary Information

Facile synthesis of carbon decorated silicon nanotube arrays as anode material for high-performance lithium-ion batteries

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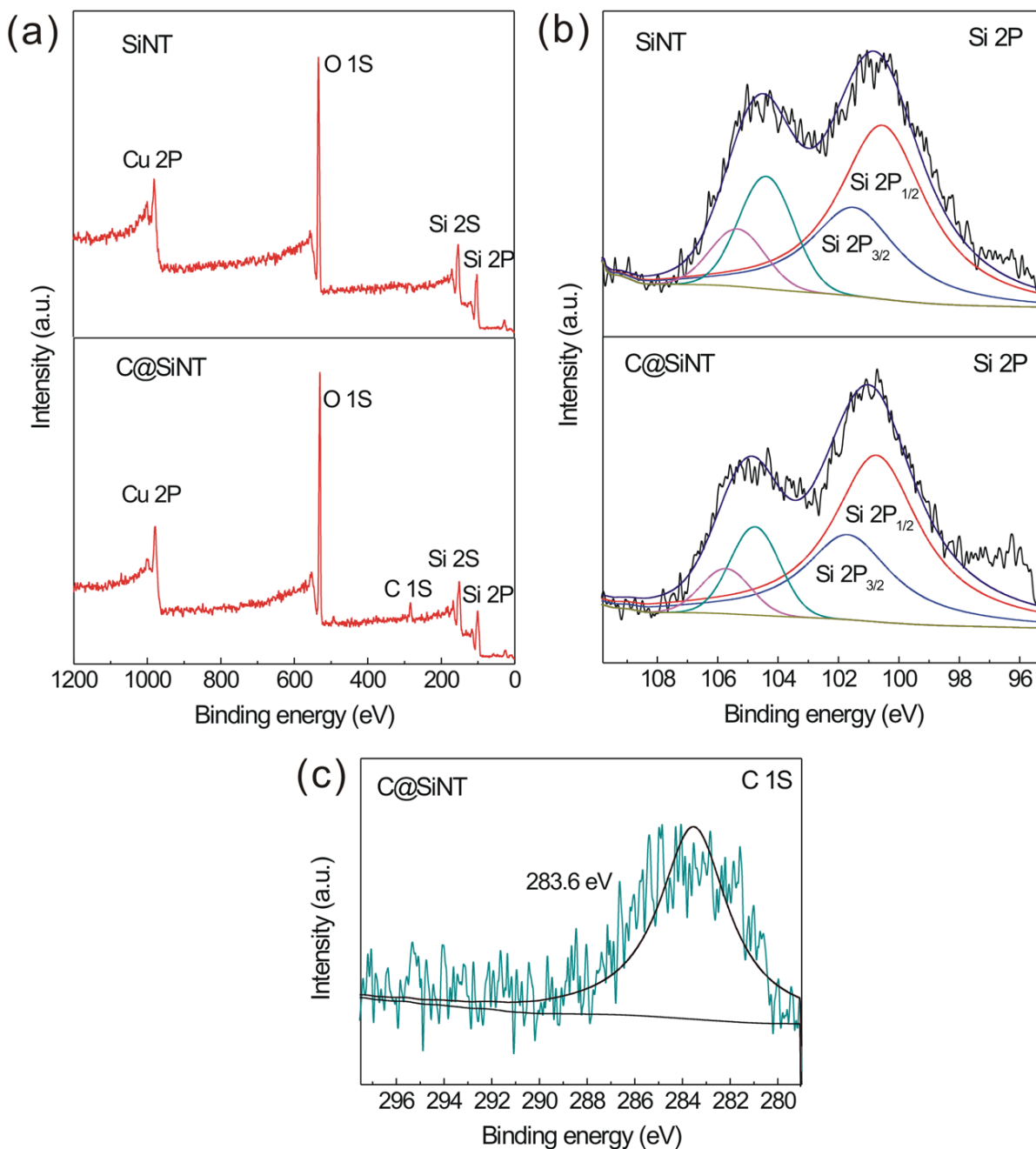


Fig. S1 (a) XPS survey spectra of SiNT and C@SiNT, (b) Si 2P core level spectra of SiNT and C@SiNT, (c) C 1S spectrum of C@SiNT.

The XPS characterization was carried out as demonstrated in Fig. S1. In Fig. S1 (a), the survey spectra of SiNT and C@SiNT are shown, from which it can be observed that C 1S peak

appeared at 284.7 eV in C@SiNT, while there is no carbon signal found in the survey spectrum of SiNT. It verifies that carbon has been grown on the sample of C@SiNT. Furthermore, the Si 2P core level spectra of SiNT and C@SiNT are recorded in Fig. S1(b), of which the Si 2P_{1/2} and Si 2P_{3/2} were marked. By comparison, it seems that there is no difference between SiNT and C@SiNT for Si 2P spectra, which suggests that the carbon were decorated by physical adsorption instead of forming chemical bonding, i.e. Si-C. In Fig. 1S(b), other two splitted peaks are appeared, which are suggested to assign to the Si-O bonding due to the oxidation of silicon nanotube, because the characterization of the samples was performed after several days of the sample preparation. Thus we can conclude that both SiNT and C@SiNT have been oxidized in some extent for the long time placed. It is in constant with the observation demonstrated in Fig. 1S (a) as a strong O 1S peak existing in the survey spectra for both two specimens. For C@SiNT, the C 1S core level spectrum was further performed as shown in Fig.S1(c). A broad peak at 283.6 eV is displayed, which is associated with sp² hybridized carbon. As the charge compensation was adopted during the characterization process, which causes the peak shift and its broaden, the carbon peak is located at 283.6 eV instead of 284.7 eV.